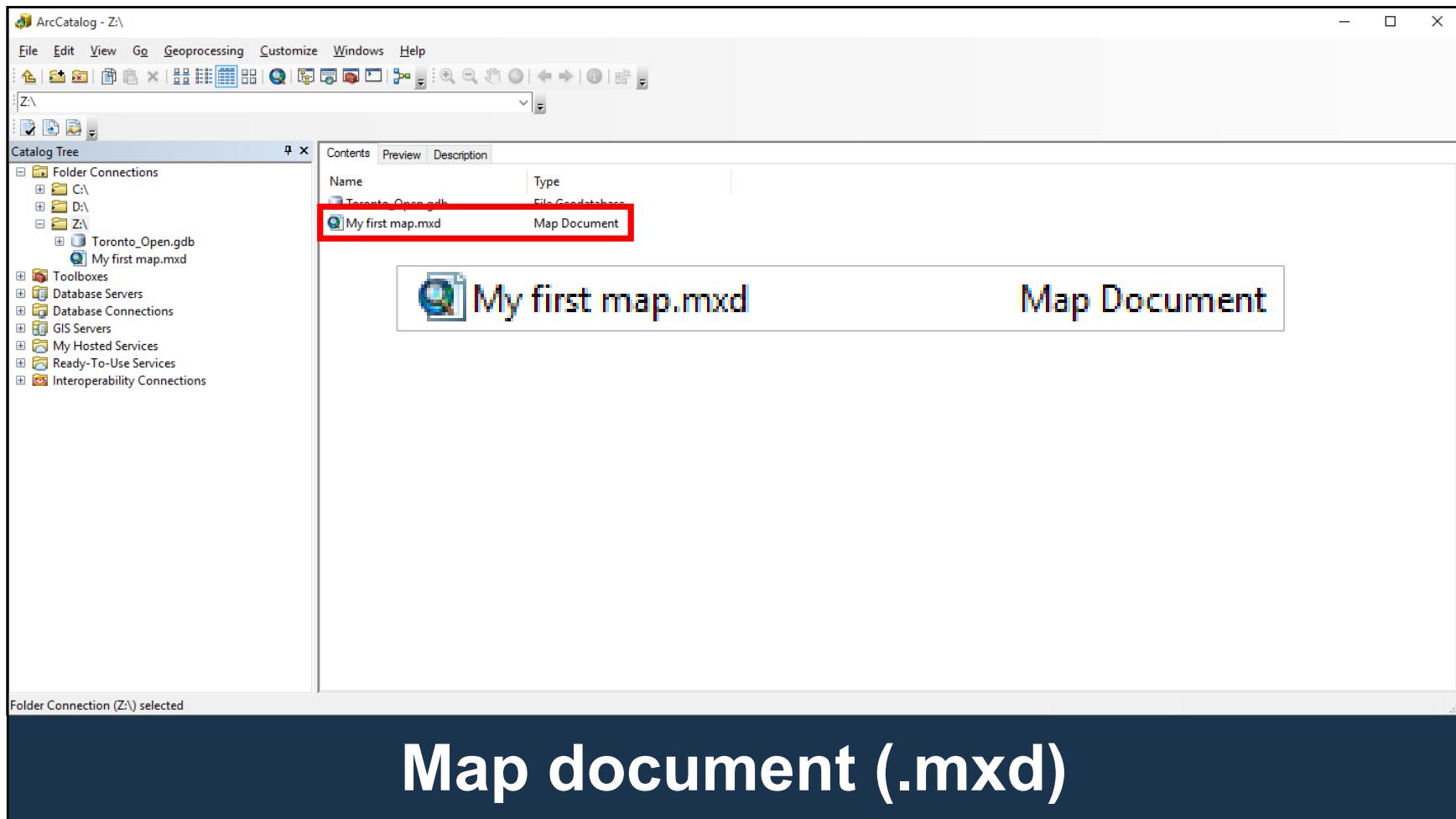


# ArcMap



# Map document (.mxd)

Stores:

- ◆ What data to show
- ◆ Where to find the data
- ◆ How to show the data

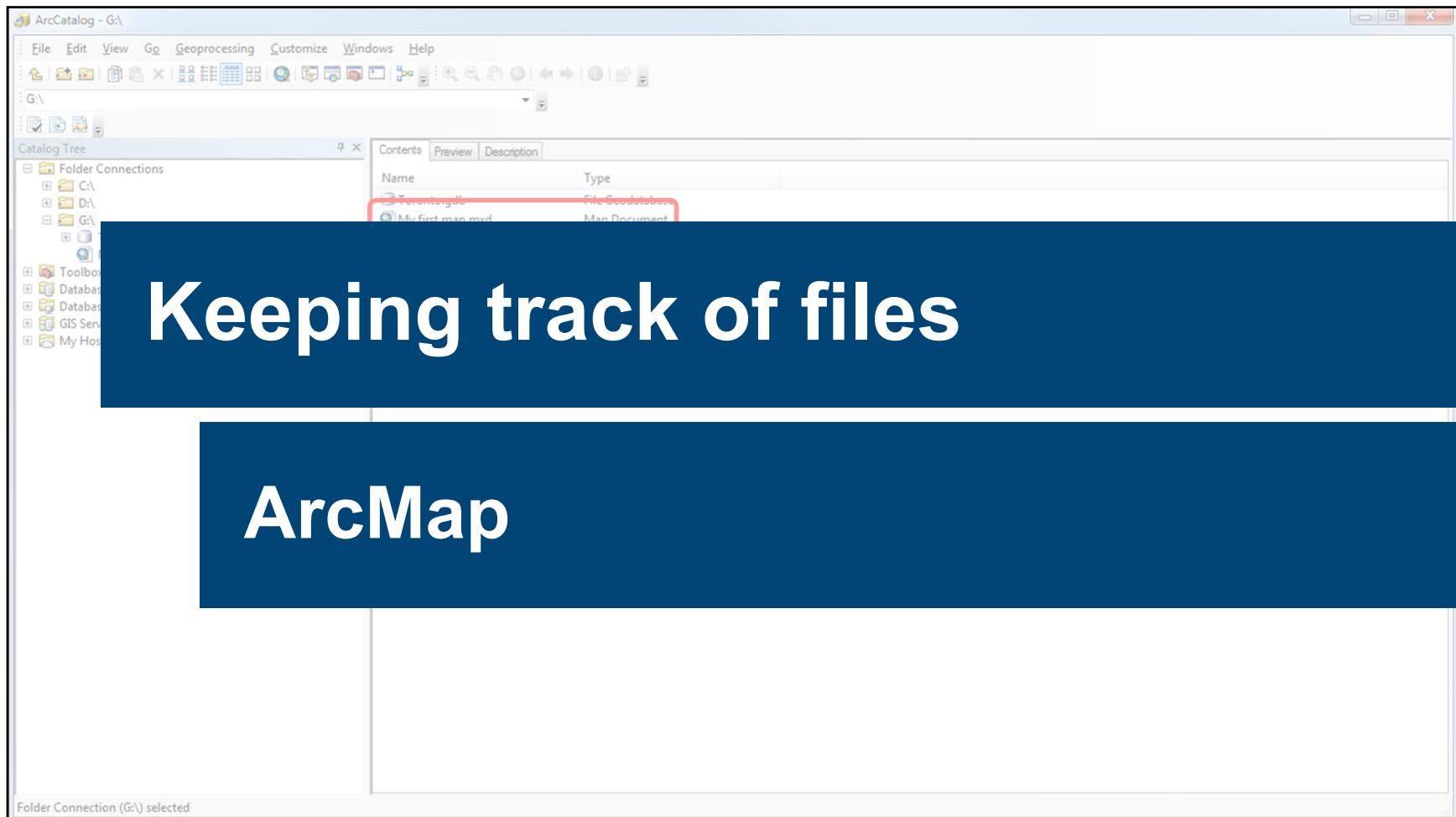
Name	Type
 My first map.mxd	Map Document

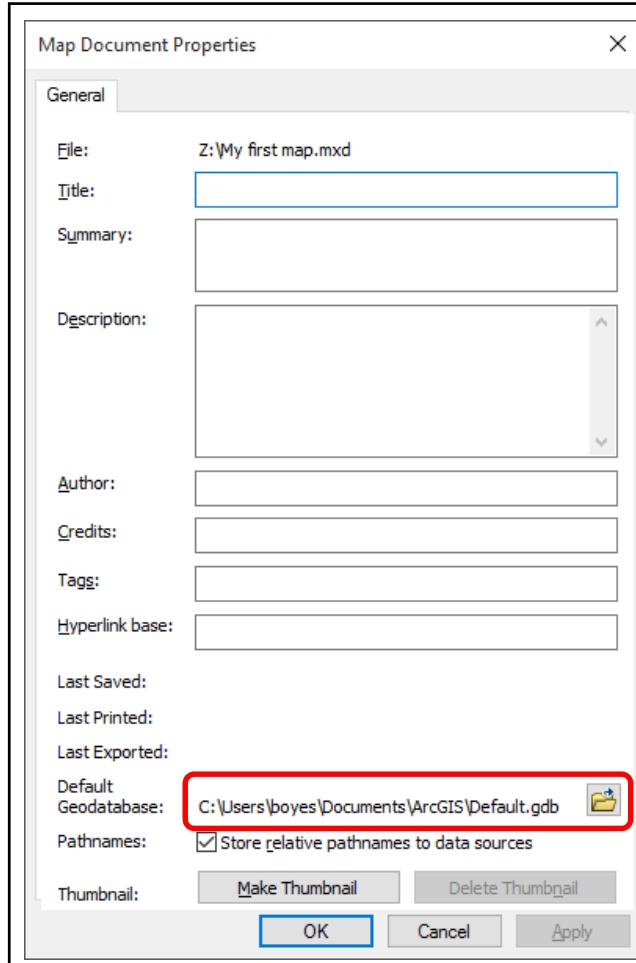
It does not store the actual map data

- ◆ Why not?

# Map document

- Store data once
  - ◆ Different map documents can show the same data in different ways
    - **Black roads** vs. **red roads**
    - Different people can access same data, show it the way they want
  - ◆ Update data once, reflected on all maps.



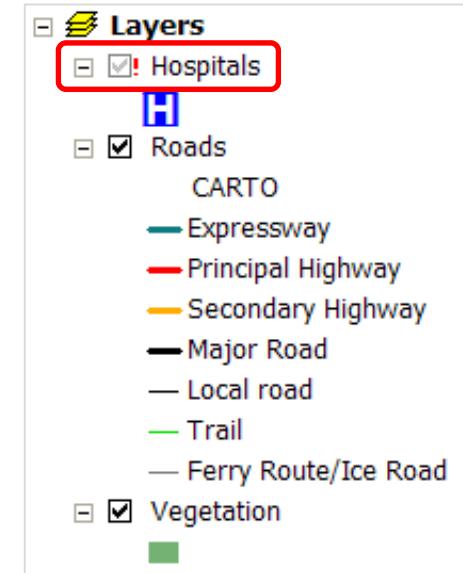
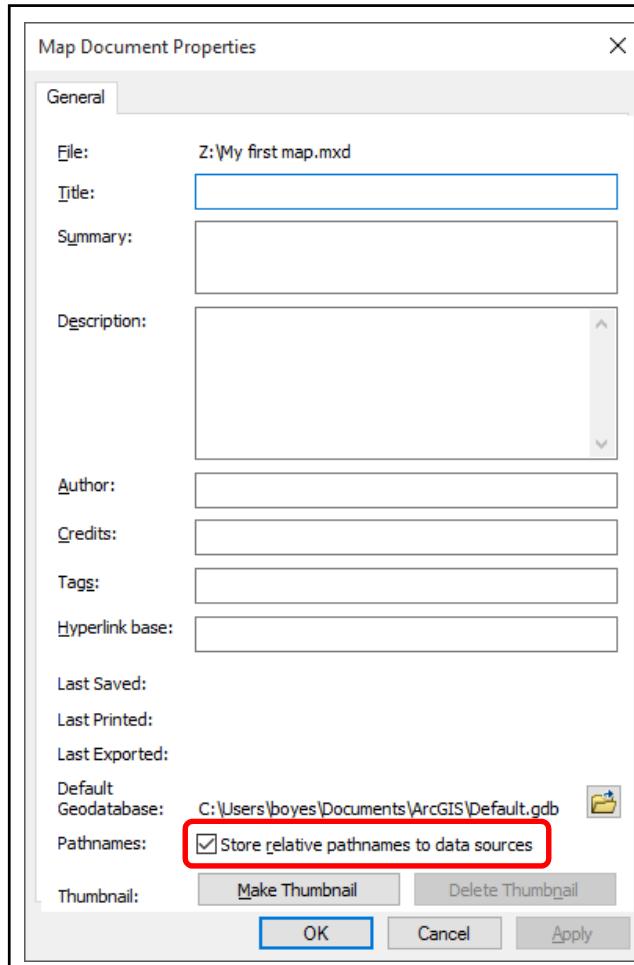


## Setting the default geodatabase

- Good idea to create new file geodatabase for each new project (e.g., assignment)
- Make a habit of setting this for every new map document
- Make sure to set it to a drive that you can access later.

# Relative pathnames and moving data/projects

- Make sure this is checked



# Jack Dangermond

# Jack Dangermond



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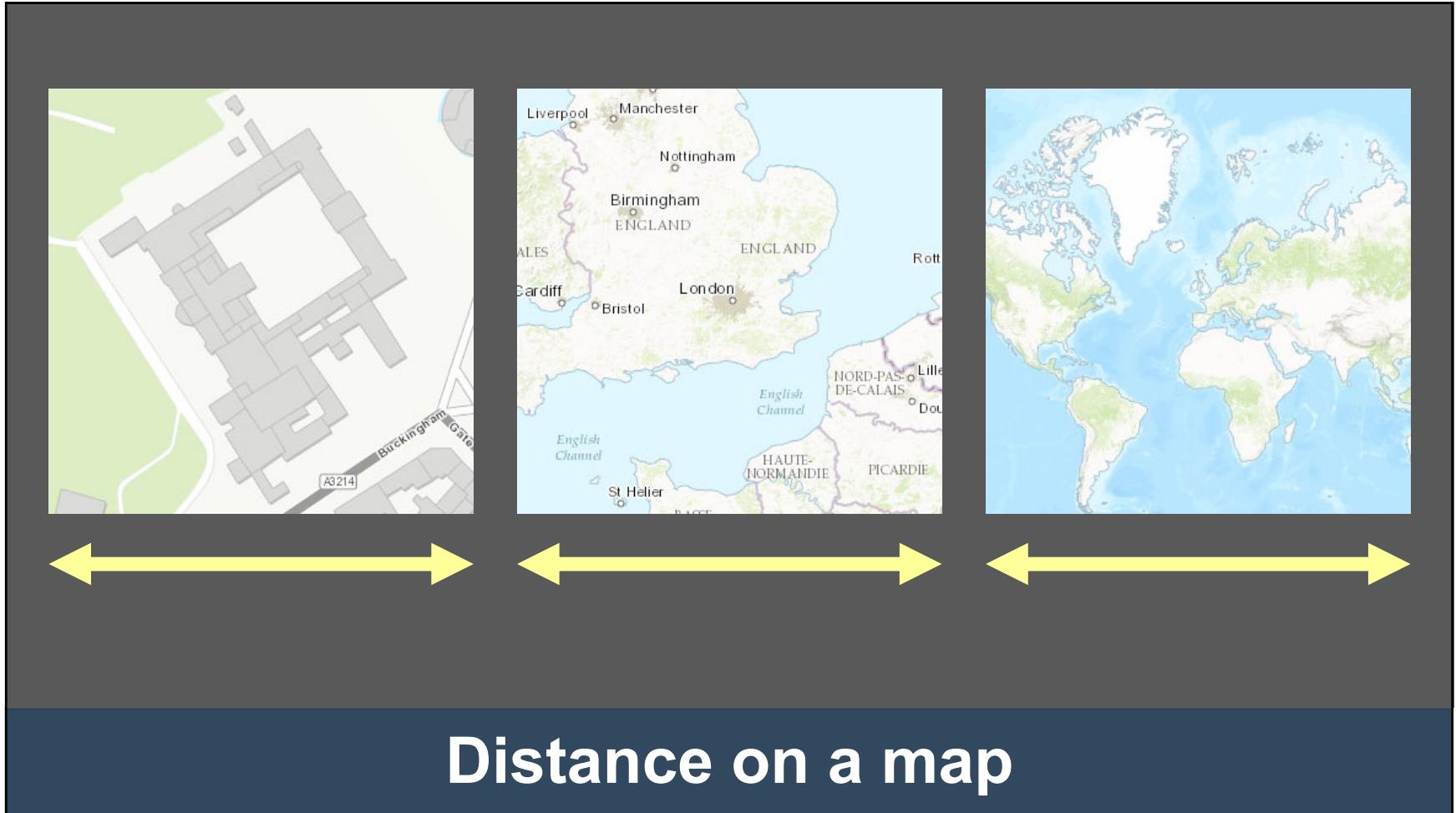
- Education in urban planning, landscape architecture at Harvard
- President and founder of Environmental Systems Research Institute Inc. (ESRI)
- Commercialized GIS

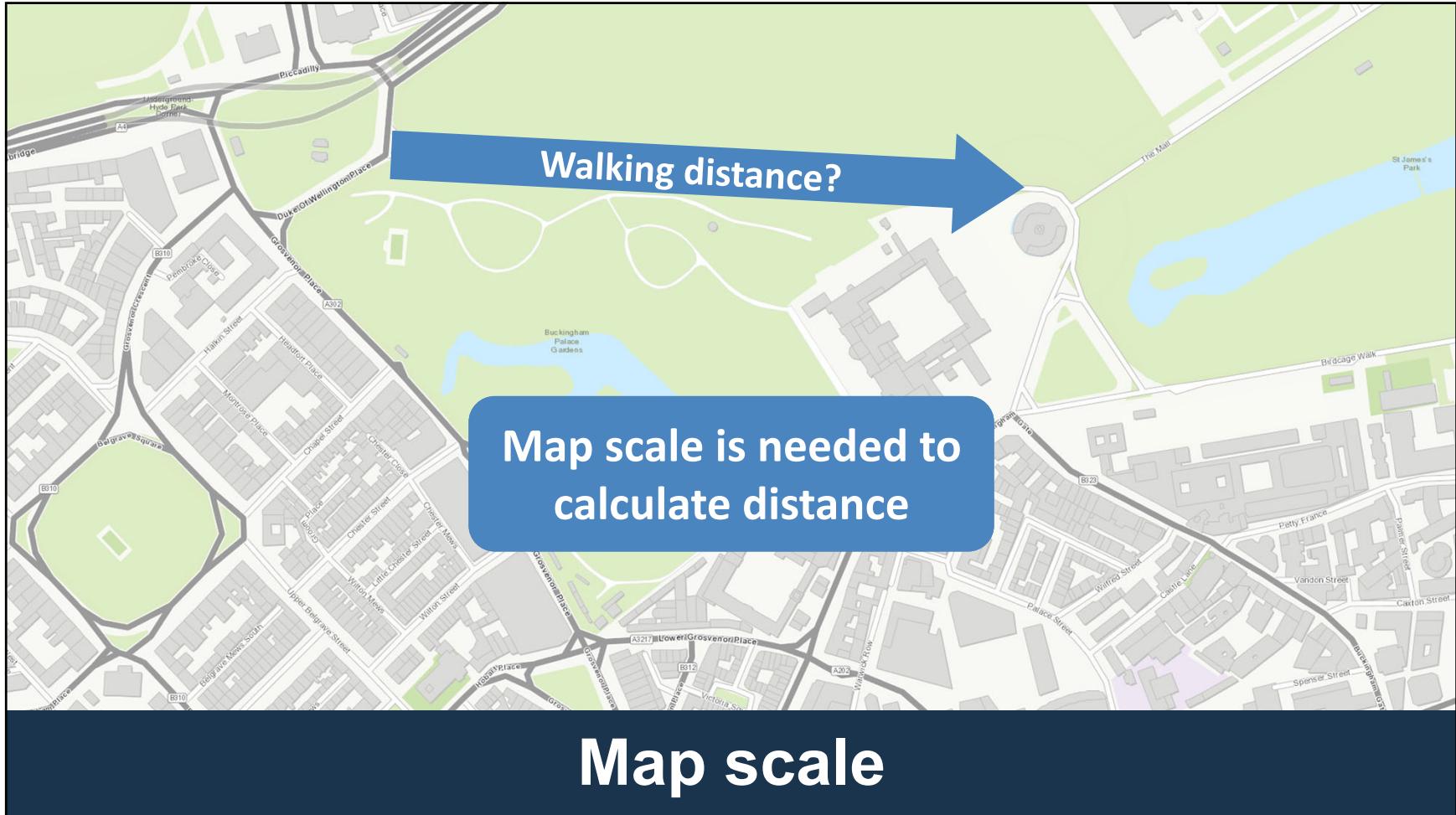
# Map scale

Scale 1:5,000

$$\frac{1}{5,000} = \frac{10 \text{ cm}}{x}$$
$$x = 10 \text{ cm} \times 5,000$$

Actual distance = 50,000 cm  
= 500 m





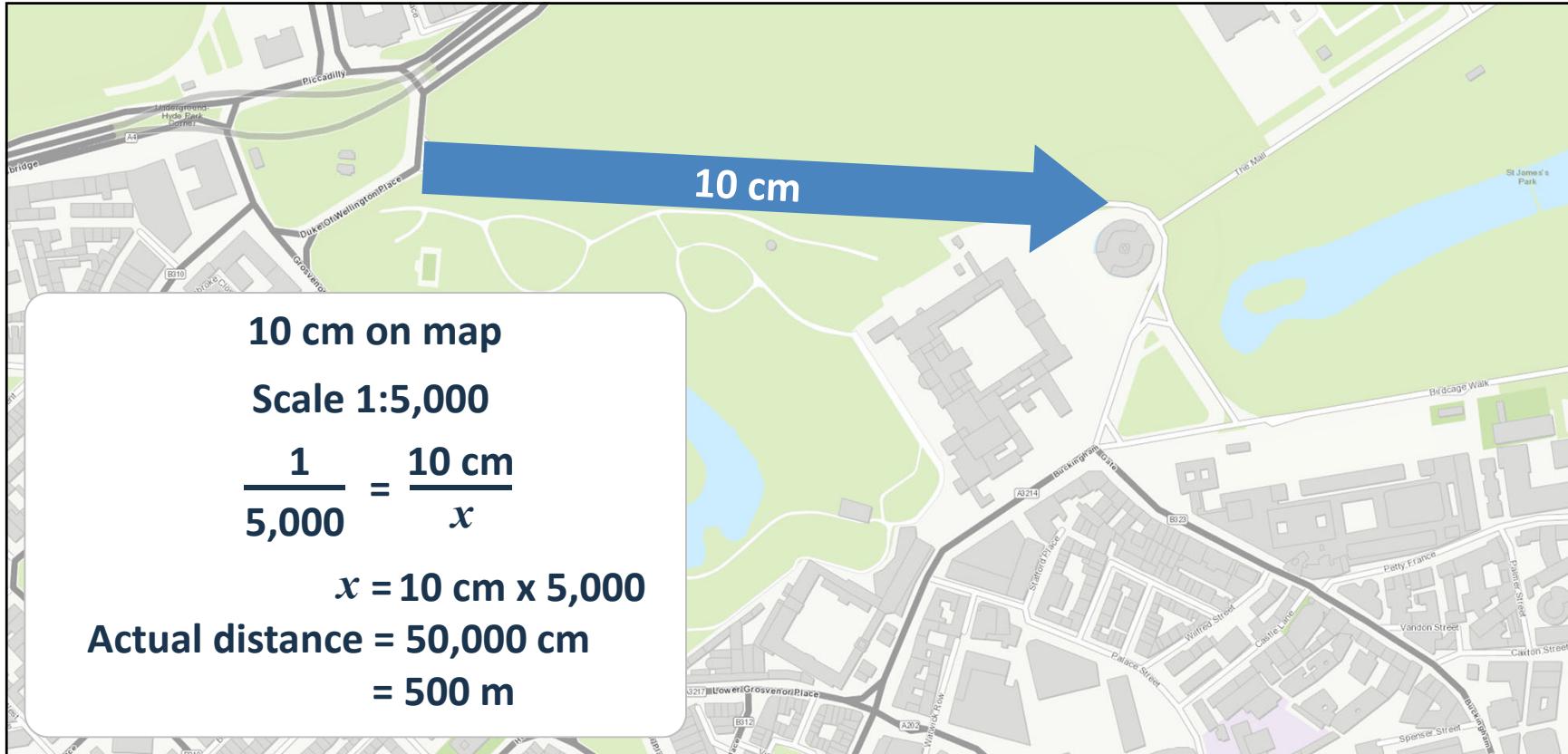
**$\frac{\text{Map distance}}{\text{Ground distance}}$**

$\frac{1}{250,000}$

**1:250,000**

Always 1

## Map scale



## Calculating distances using map scale

**1:500,000**  
**Representative fraction**  
**(absolute scale)**

**“one inch to one mile”**  
**Verbal scale**

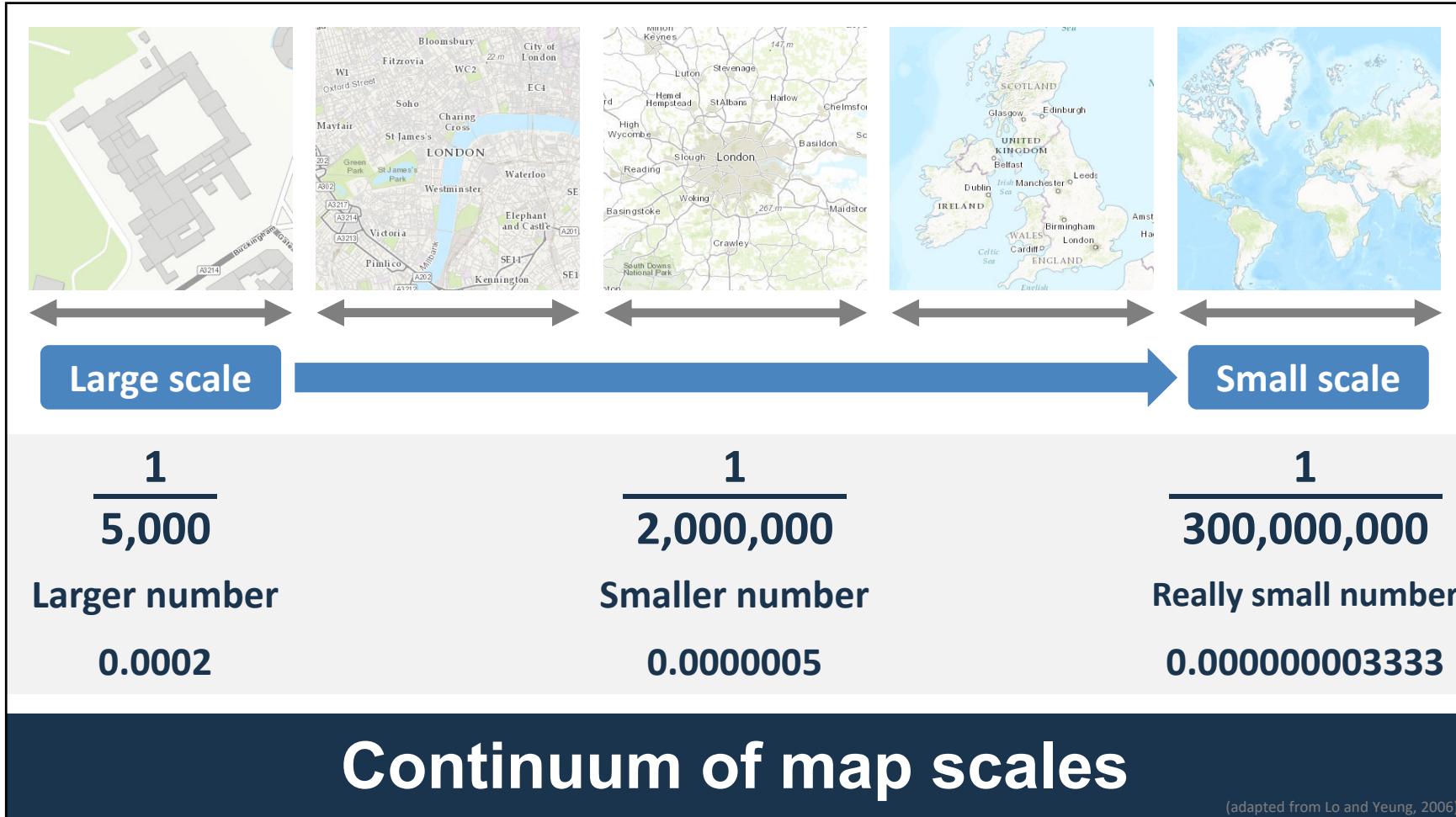
**0    50    100    200    300    400 Km**

**Bar scale**



Is this a large scale  
or small scale map?

Small scale!



Map distance  
Ground distance

Scale on a web map

Map scale 1:?

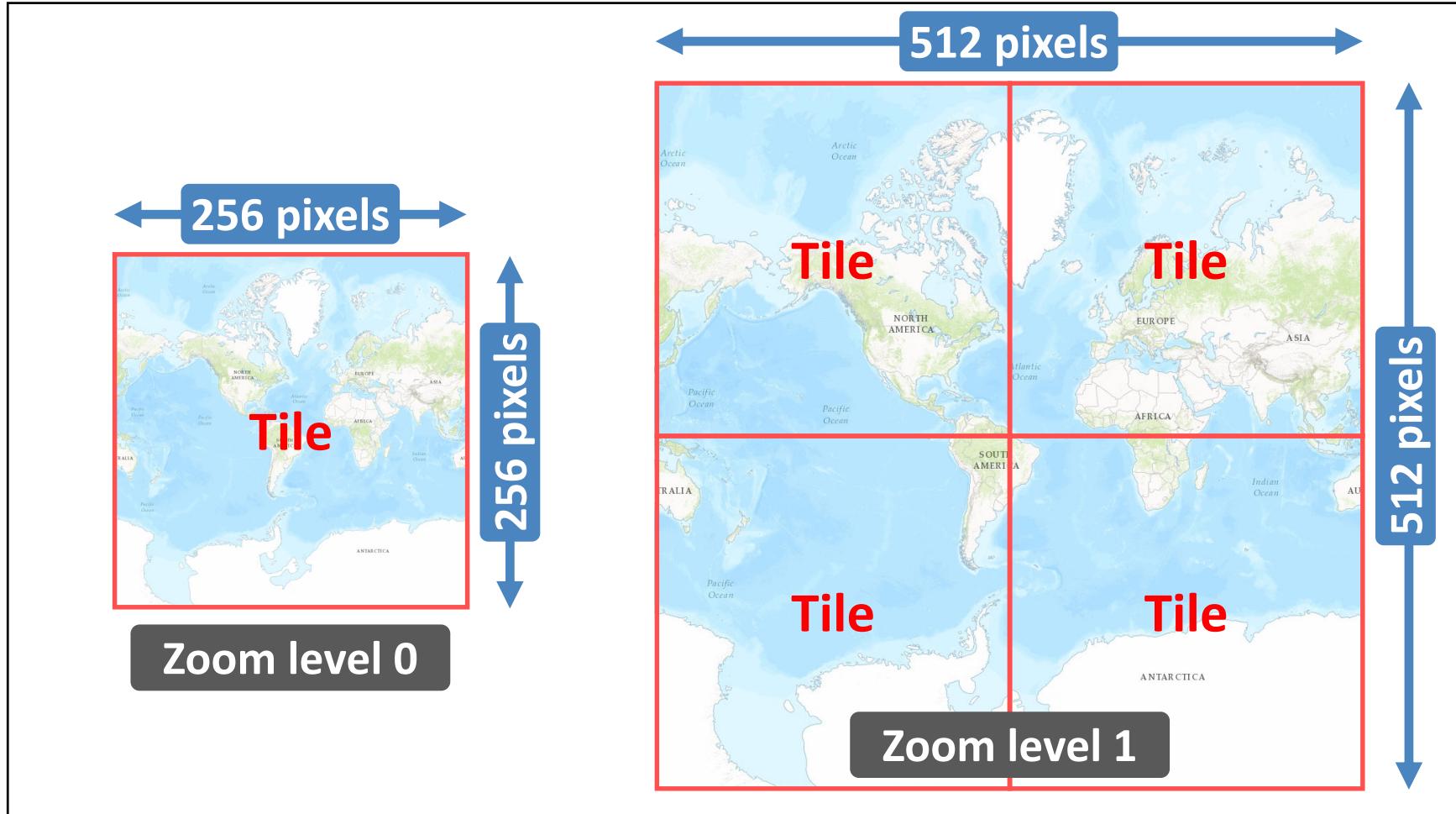
$$\frac{1}{x} = \frac{0.093 \text{ m}}{69.0 \text{ m}}$$

$x = 741.9$

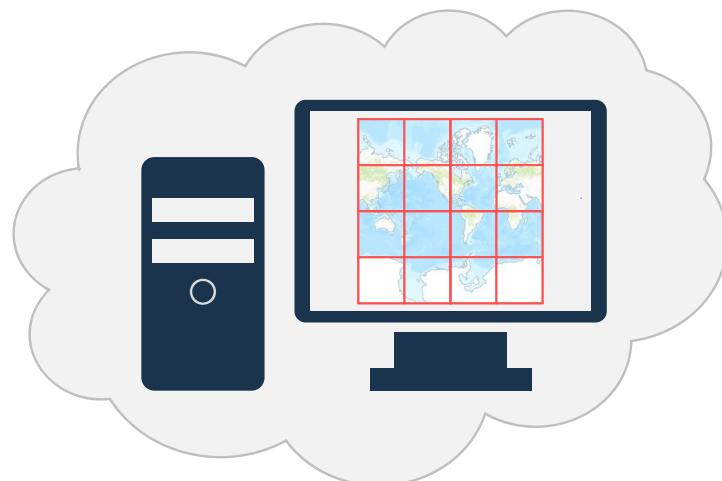
Map scale = 1:742







## Esri's cloud servers



All map tiles at all zoom levels  
(huge amount of data)

## Your device



Only the tiles you need  
(very small amount of data)



**How can we calculate web map scale?**

**Map distance**  
Ground distance

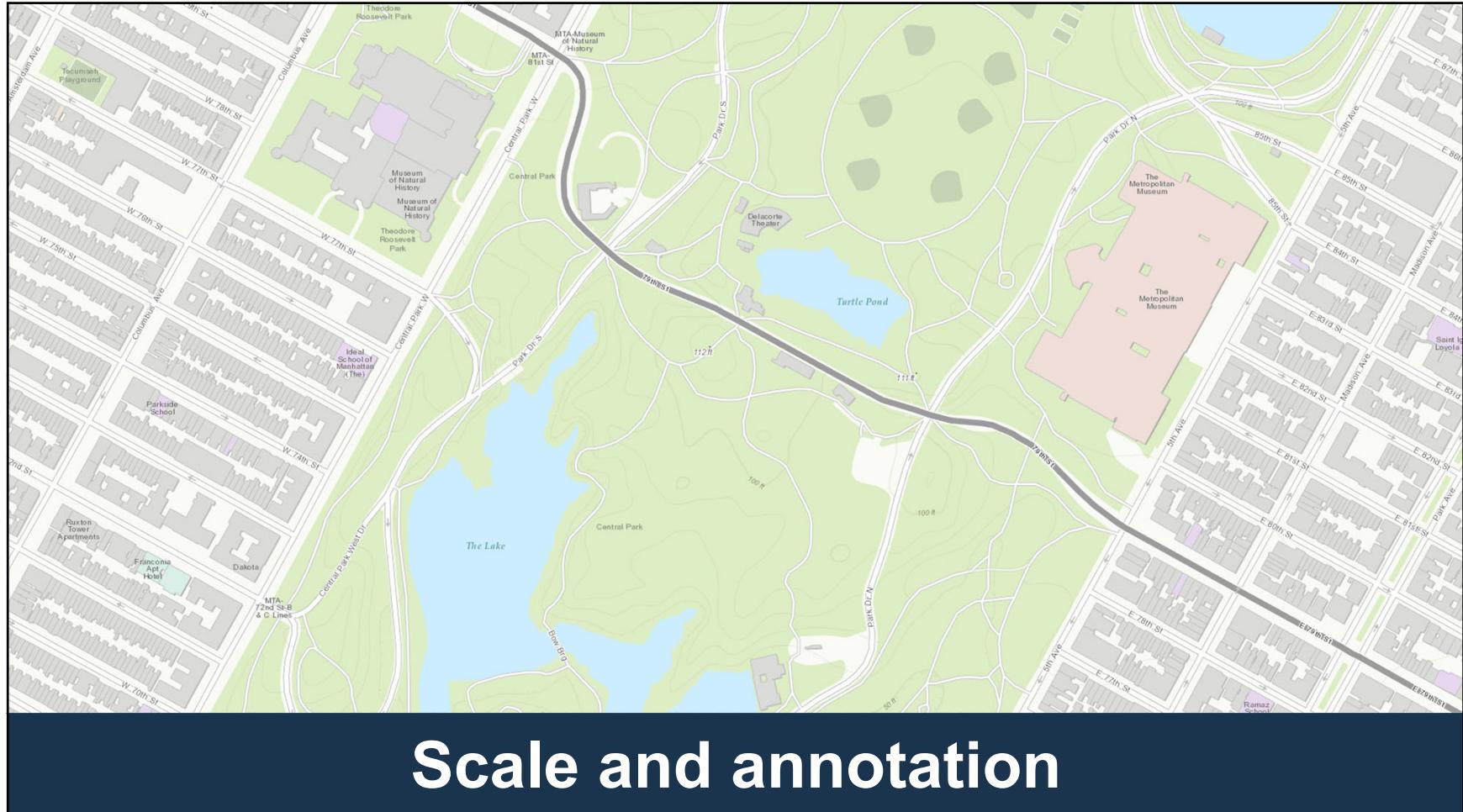
**9.3 cm on map, 69.0 m on ground**

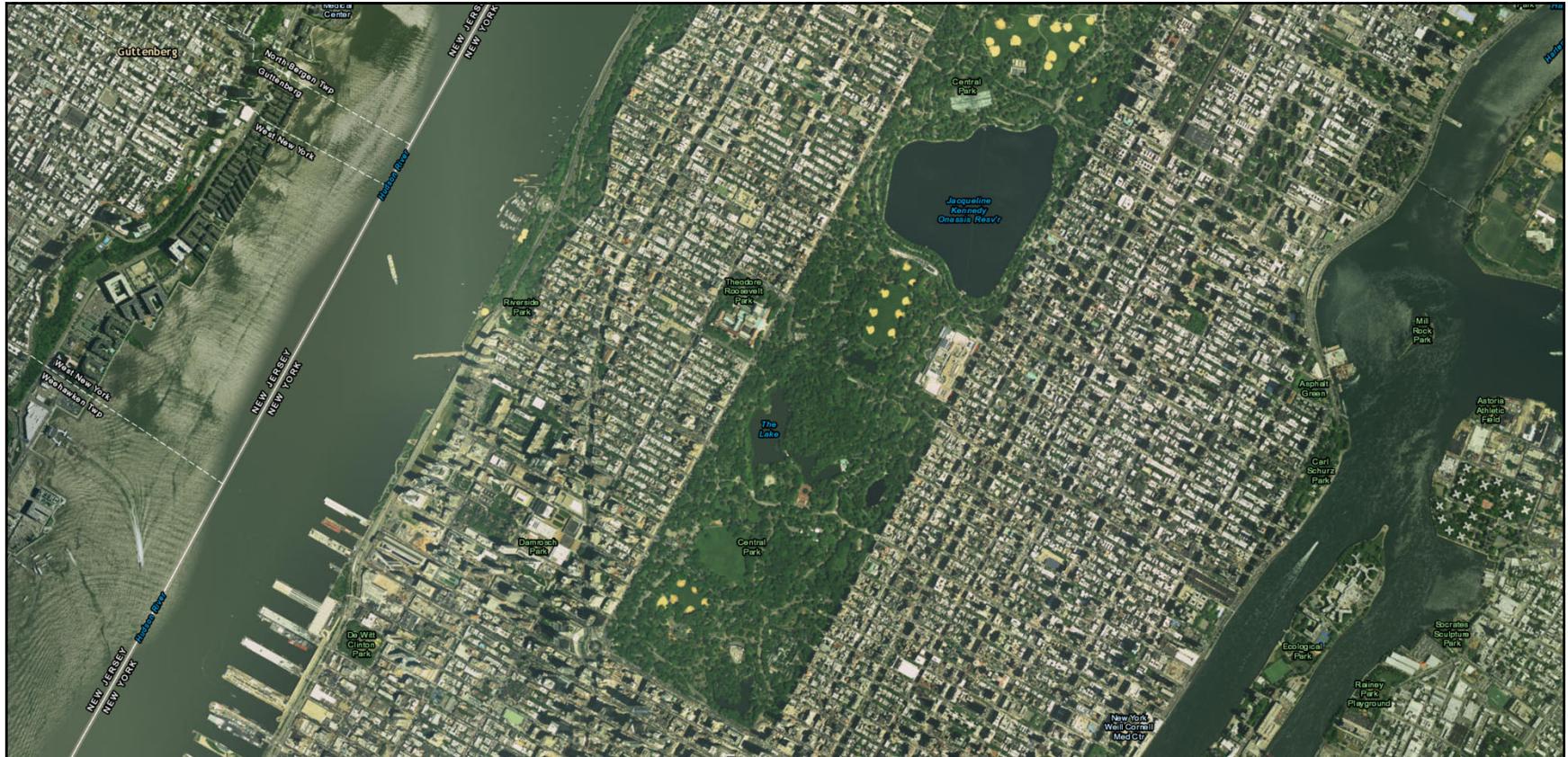
**Map scale 1:?**

$$\frac{1}{x} = \frac{0.093 \text{ m}}{69.0 \text{ m}}$$
$$x = 741.9$$

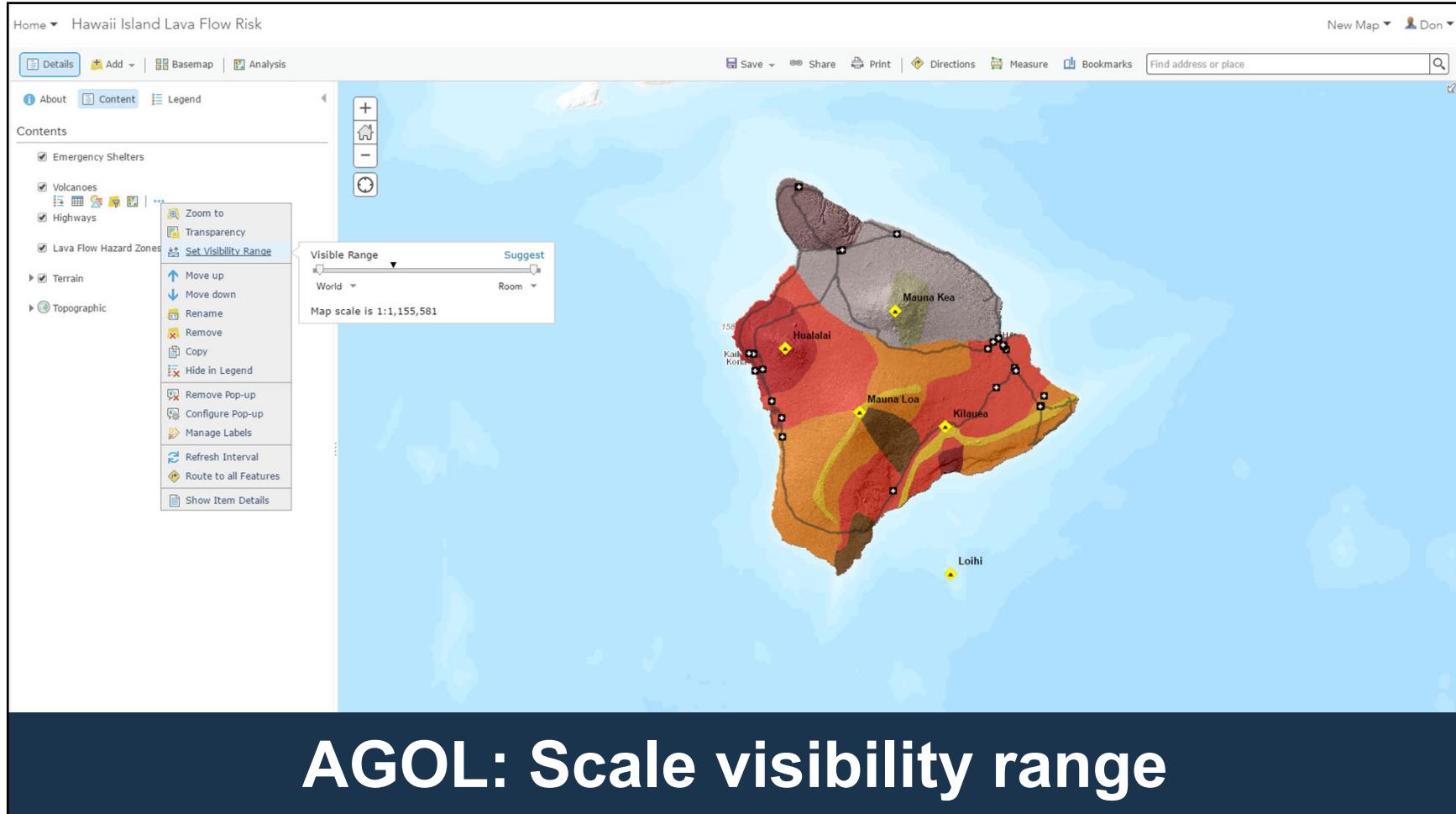
**Map scale = 1:742**

# Calculating map scale





## Basemap choice and annotation



**Hawaii Island Lava Flow Risk.mxd - ArcMap**

File Edit View Bookmarks Insert Selection Geoprocessor Tools Help

ArcToolbox

- 3D Analyst Tools
- Analysis Tools
- Cartography Tools
- Conversion Tools
- Coverage Tools
- Data Interoperability Tools
- Data Management Tools
- Data Reviewer Tools
- Editing Tools
- Geocoding Tools
- Geostatistical Analyst Tools
- Linear Referencing Tools
- Multidimension Tools
- Network Analyst Tools
- Parcel Fabric Tools
- Schematics Tools
- Server Tools
- Space Time Pattern Mining Tools
- Spatial Analyst Tools
- Spatial Statistics Tools
- Tracking Analyst Tools

Table

EmergencyShelters

OBJECTID	
1	Hilo High School
2	Hualuo Elementary School
3	Honaunau Elementary School
4	Hookena Elementary School
5	Kau High and Pahala Elementary
6	Kaumana Elementary School
7	Kohala Elementary School
8	Maiaakeauna Elementary School

(0 out of 27 Selected)

Layer Properties

General Source Selection Display Symbology Fields Definition Query Labels Joins & Relates Time HTML Popup

Layer Name: Volcanoes  Visible

Description:

Credits:

Scale Range

You can specify the range of scales at which this layer will be shown:

Show layer at all scales

Don't show layer when zoomed:

Out beyond: 1:1,000,000 (minimum scale) 

In beyond: 1:10,000 (maximum scale) 

OK Cancel Apply

Georeferencing Catalog

Location: Home - ArcgisAgol

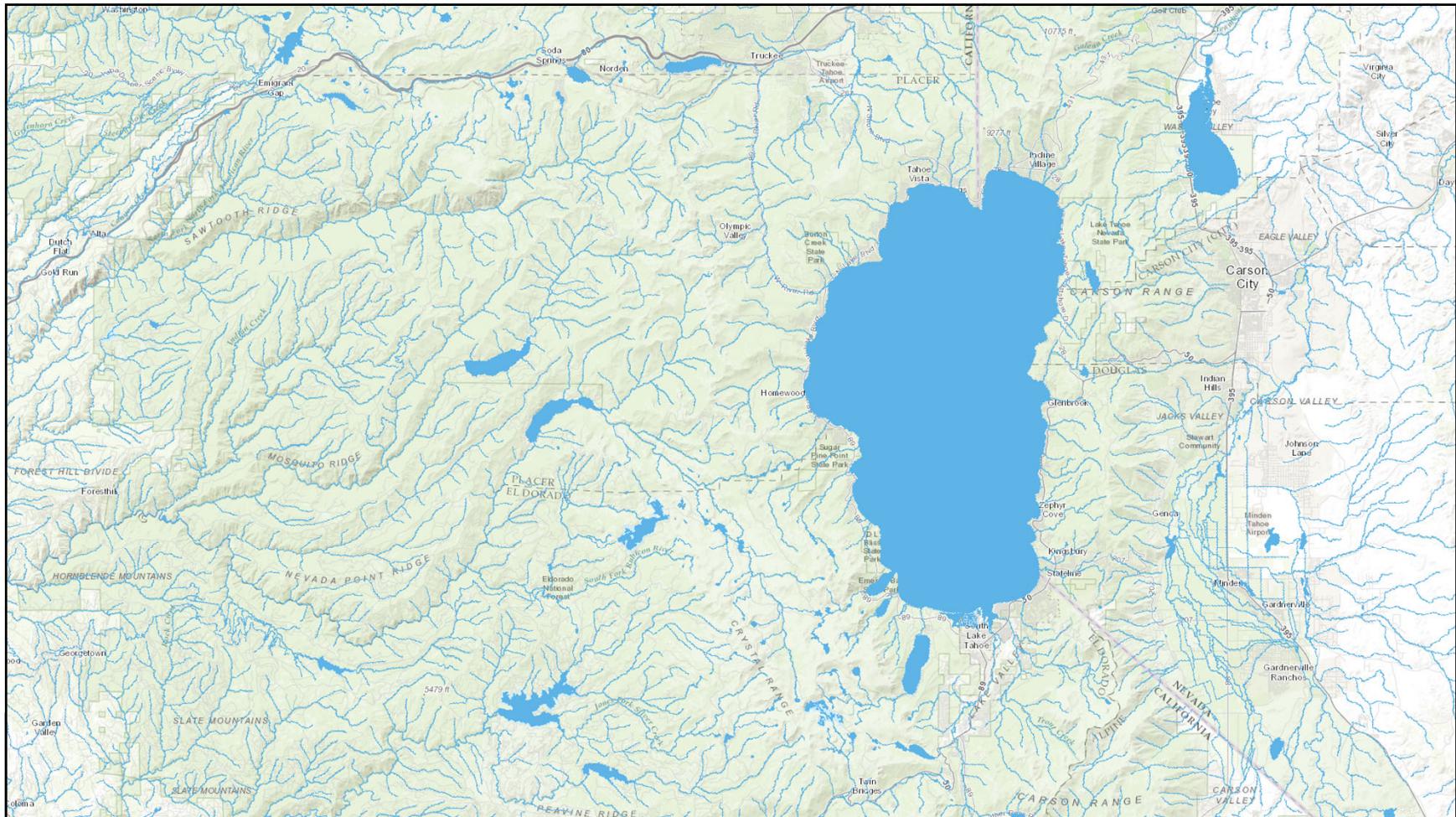
- Home - ArcgisAgol
  - Folder Connections
    - G1
    - D1
    - Z1
  - Toolboxes
  - Database Servers
  - Database Connections
  - GIS Servers
  - My Hosted Services
  - Ready-To-Use Services
  - Interoperability Connections
  - Tracking Connections

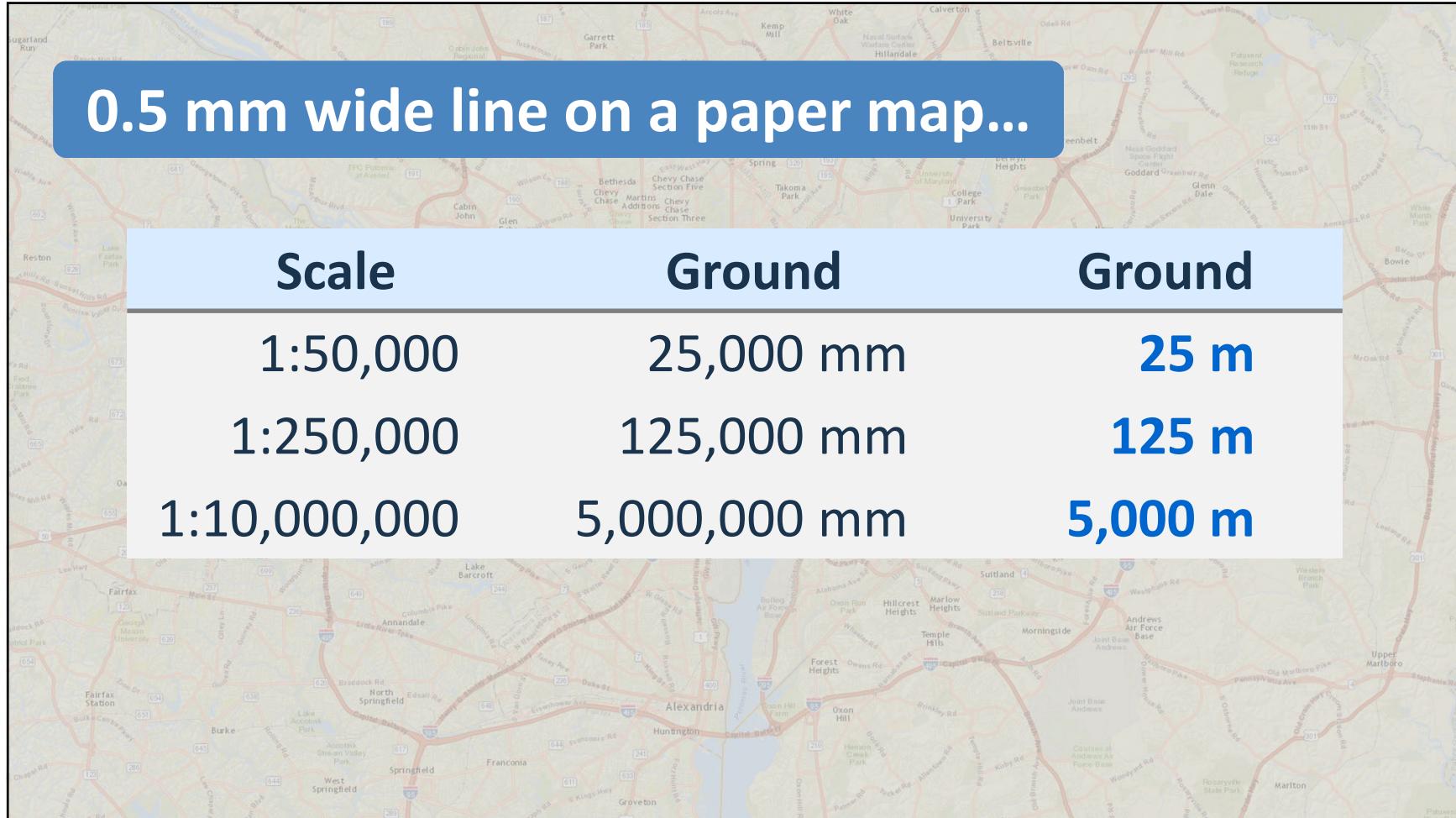
Shape \*

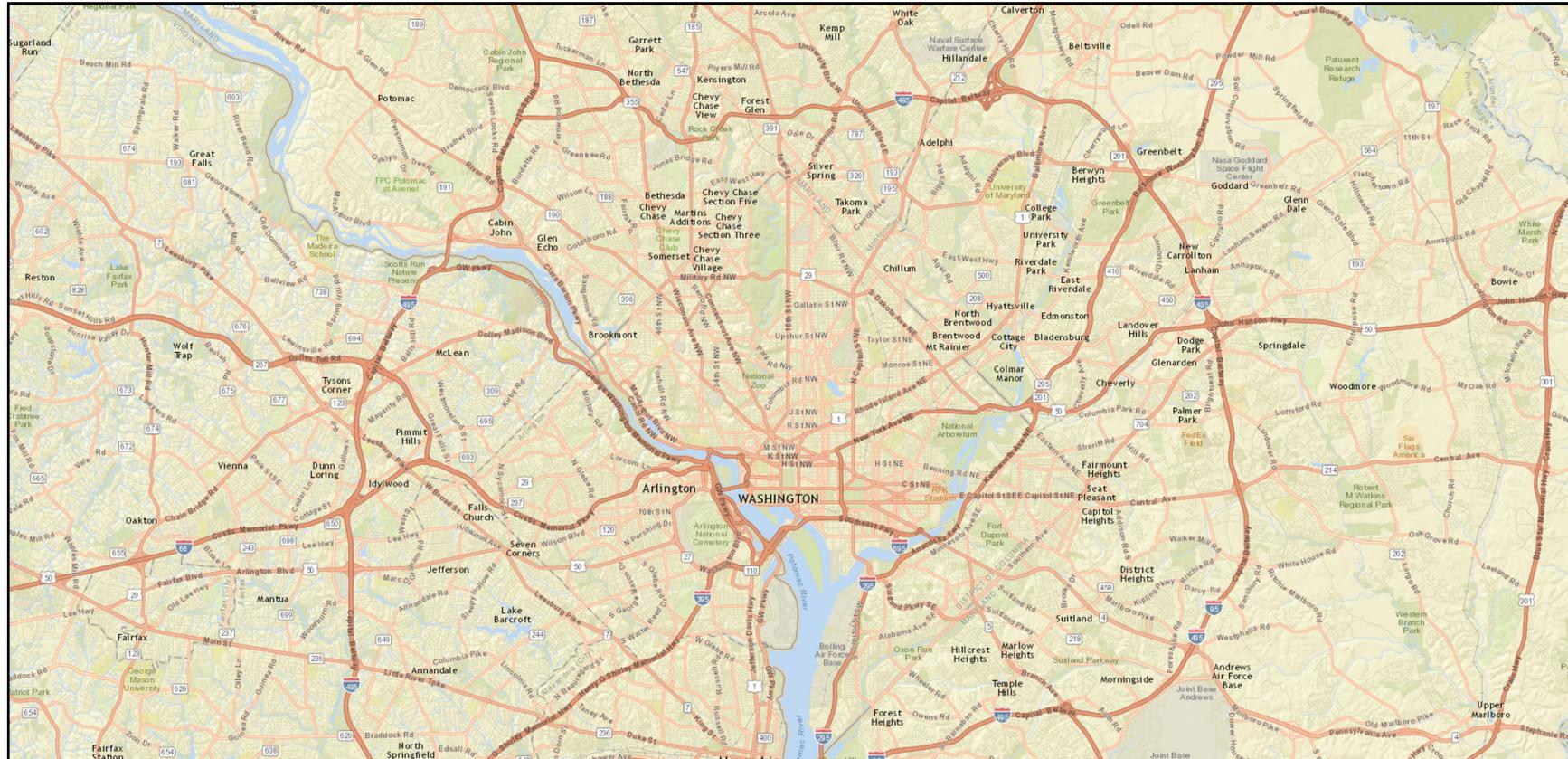
Point Point Point Point Point Point Point Point

-17427134.36 2311398.945 Meters

# ArcMap: Scale range for display







Scale affects how entities are represented

